

Grade 9 - Examples

Evaluate:

a) $(2x^2 - 3x + 1) + (x^2 - x - 4)$

$$= 2x^2 - 3x + 1 + x^2 - x - 4$$

$$= 3x^2 - 4x - 3$$

b) $-(3 - 2x)$

$$= -3 + 2x$$

c) $-2(x^2 + 2x - 3)$

$$= -2x^2 - 4x + 6$$

d) $(2x^2 - 2x - 3) - (x^2 - 4x + 2)$

$$= 2x^2 - 2x - 3 - x^2 + 4x - 2$$

$$= x^2 + 2x - 5$$

3.4 Expanding and factoring Algebraic Expressions

- Use the base 10 blocks to show $2 \times 3 = 6$

- Now use the base 10 blocks to show $12 \times 13 = \underline{156}$

- In your models of $2 \times 3 = 6$ and $12 \times 13 = \underline{156}$, what do each of the following represent?

2: Side
 3: Side
 6: Area

12: Side
 13: Side
 Answer: Area

- Use the base 10 blocks to find the answers to $15 \times 17 = \underline{255}$ and $14 \times 18 = \underline{252}$
- Can you now find the answer to 27×34 ?
- What are the limitations of base 10 blocks?
- Can you represent 15×17 by a drawing instead of using the base 10 blocks?
- Now try finding the answer to 25×13 by drawing an area model.

Recall: Multiplying two linear terms together forms an area.

We can often represent this multiplication using algebra tiles.

Algebra tiles for $(x+2)(x+3)$. The top row consists of one x^2 tile, one x tile, and one 1 tile. The bottom row consists of one x tile, one x tile, and one 1 tile. The tiles are arranged to form a rectangle with dimensions $(x+2)$ by $(x+3)$.

Algebra tiles for $(-x+2)(-x+3)$. The top row consists of one $-x^2$ tile, one $-x$ tile, and one 1 tile. The bottom row consists of one $-x$ tile, one $-x$ tile, and one 1 tile. The tiles are arranged to form a rectangle with dimensions $(-x+2)$ by $(-x+3)$.

Evaluate: $(x + 2)(x + 3)$

Area model for $(x+2)(x+3)$. The rectangle is divided into six regions: one x^2 region, three x regions, and two 1 regions. The dimensions are $(x+2)$ by $(x+3)$.

$x^2 + 5x + 6$

	x	3
x	x^2	$3x$
2	$2x$	6

Evaluate: $(x - 3)(x + 1)$

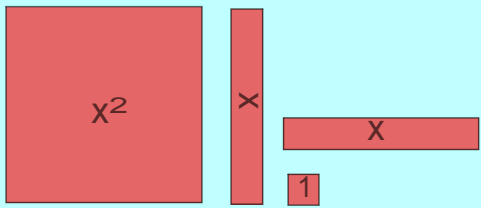
$$x^2 - 2x - 3$$

	x	+1
x	x ²	x
-3	-3x	-3

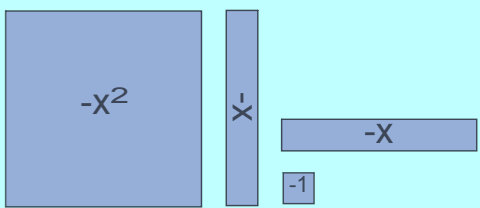
Evaluate: $(2x - 1)(x - 2)$

$$= 2x^2 - 5x + 2$$


	2x	-1
x	2x ²	-x
-2	-4x	2

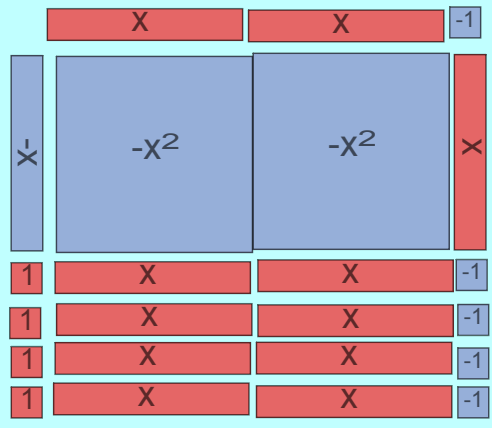


Red tiles: x^2 , x , 1



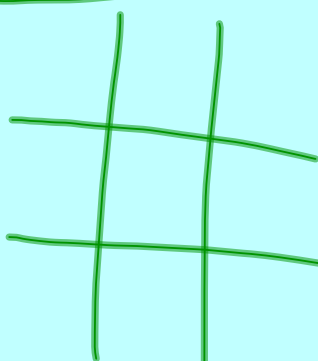
Blue tiles: $-x^2$, $-x$, -1

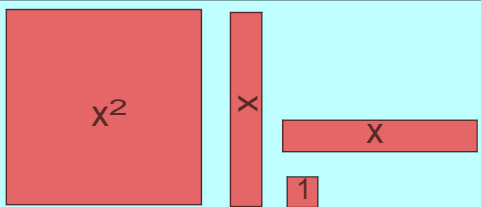
Evaluate: $(2x - 1)(4 - x)$ Need a Hint? $(-x+4)$ 



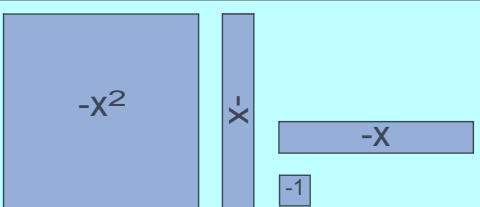
Algebra tile arrangement for $(2x - 1)(4 - x)$:
 $-2x^2 + 9x - 4$

$-2x^2 + 9x - 4$






Red tiles: x^2 , x , 1



Blue tiles: $-x^2$, $-x$, -1

Evaluate: $(x + y)(2x - y)$ 

FOIL

	$2x$	$-y$
x	$2x^2$	$-xy$
y	$2xy$	$-y^2$

$2x^2 + xy - y^2$

$$\begin{aligned} &= 2(x+4)(x-6) \\ &= 2(x^2 - 2x - 24) \\ &= 2x^2 - 4x - 48 \end{aligned}$$